Exploring the World Inside US Prisons for Safety, Health, and Isolation*

Dong Jun Yoon   Sirui Tan

February 9, 2024

This study replicates and extends research on prison safety, health, and COVID-19 impact, finding significant disparities in incarceration rates between black and white individuals, particularly among those with lower education levels. The findings highlight the enduring issue of mass incarceration in the United States and emphasize the urgent need for comprehensive strategies to address inequalities within the criminal justice system. Understanding these disparities is critical for promoting a more equitable society and enhancing outcomes for marginalized populations.

Table of contents

---

1 Introduction

Over the past three decades, incarceration has become a potent force in perpetuating and exacerbating social inequality, as evidenced by extensive sociological research highlighting America's experiment with mass incarceration and its impacts on social stratification (Wakefield and Uggen (2010)). This trend underscores the broader societal shift towards the expansion of the penal system, marking it as one of the most salient developments in contemporary American society.

Rooted in the insights from the paper *Inside the Box: Safety, Health, and Isolation in Prison* (Western (2021)), our analysis aims to illuminate the profound impacts of incarceration on the safety and health of incarcerated individuals.

With a primary focus on the United States, where the concept of "mass incarceration" looms large, our investigation delves into the remarkable surge in the prison population since the 1970s, despite recent minor declines. Particularly noteworthy is the disproportionate rates of incarceration faced by Black men with limited education, underscoring systemic injustices within the justice system. Furthermore, our study comprehensively examines various dimensions of incarceration, including its implications for crime rates, labor markets, and family dynamics. Through this analysis, we uncover persistent challenges in prisoner rehabilitation and societal reintegration, shedding light on critical issues often overlooked in public discourse.The significance of this research lies in its contribution to understanding the multifaceted impacts of mass incarceration, both on individuals and society at large. By addressing the gap in knowledge regarding the health and safety implications of incarceration, we aim to inform policy discussions and advocate for reforms that prioritize the well-being of incarcerated individuals.

Our estimand aims to assess the extent of mass incarceration within the country using the incarceration rate (per 100,000 population). Additionally, we seek to compare the incidence rate of new coronavirus infections among incarcerated individuals with that of the general population in the United States during the epidemic. This comparison will provide insights into the health status and vulnerability of the prison population relative to the broader community.

This article is structured as follows: In Section 2, we provide insights into the origin of the dataset utilized in the original paper, outlining the methods employed for data collection and emphasizing key features. Moving on to Section 3, we replicate the original study and present three empirical markers of "mass incarceration." In Section 4, we delve into the health effects of mass incarceration on both offenders and prison staff during the epidemic. Additionally, we critically evaluate the study's limitations and propose directions for future analyses to complement this discussion.

2 Data

2.1 Source

The paper selected for replication, *Inside the Box: Safety, Health, and Isolation in Prison* (Western (2021)), primarily investigates the impacts of prisons on safety and health, with a specific focus on data pertaining to the new coronavirus pandemic.

This paper draws from a variety of sources, including:

- Bureau of Justice Statistics (1994)
- Bureau of Justice Statistics (2004b),Bureau of Justice Statistics (2004a),Bureau of Justice Statistics (2006)
- Bureau of Justice Statistics (2019),Bureau of Justice Statistics (2020),Bureau of Justice Statistics (2021)
- Western and Pettit (2010)
- University at Albany, Hindelang Criminal Justice Research Center (2011),University at Albany, Hindelang Criminal Justice Research Center (2012),
- Institute for Crime & Justice Policy Research (2023)
- U.S. Bureau of Economic Analysis (Year)
- Pennsylvania Department of Corrections (2018)
- Carson (2020),Carson and Cowhig (2020)
- Zeng (2020)
- National Center for Health Statistics (2021)
- U.S. Census Bureau (Year)
- COVID Prison Project (2020),COVID Tracking Project (2021)

These diverse sources provide a comprehensive foundation for the replication analysis, enabling a thorough examination of the various dimensions of incarceration and its effects on safety, health, and societal dynamics.

2.2 Methodology

All data are not obtained directly through surveys or sampling statistics; rather, they are derived through meticulous processing and calculation based on pre-existing datasets.

By comprehensively understanding the dynamics within prisons, this paper aims to contribute to the discourse on mass incarceration and advocate for positive reforms. Additionally, the paper replicates and builds upon Bruce Western's findings.Data cleaning and analysis were conducted using the open-source statistical programming language `R`(R Core Team 2022), leveraging functionalities from the `tidyverse`(Wickham et al. 2019), `ggplot2`(Wickham 2016), `dplyr`(Wickham et al. 2023), `readr`(Wickham, Hester, and Bryan 2024), `tibble`(Müller and Wickham 2023),`stringr`(Wickham 2023), `haven`(Wickham, Miller, and Smith 2023), `openxlsx`(Walker 2022), `janitor`(Firke 2023), `knitr`(Xie 2023).

2.3 data cleaning and construction

In research, accurate data cleansing and structuring are imperative. Figure 1, Figure 2, Figure 4, Figure 5, Figure 6, and Figure 7 in this study stem from the original paper Inside the Box: Safety, Health, and Isolation in Prison (Western (2021)). However, due to the original author's lack of detailed explanation regarding data processing methods, we took steps to ensure the reliability and relevance of the data. Specifically, we focused on visualizing the processed data to enhance clarity and understanding.

For Figure 3, we not only obtained the updated version of the original data but also expanded it by including data from an additional 5 countries, as outlined in Table 1. This expansion was undertaken to augment the comprehensiveness of our analysis. However, to maintain the relevance and accuracy of the displayed data, we made a deliberate decision not to include countries with missing data sources from the website.

It's crucial to clarify that the "prison rate" isn't simply the quotient of incarcerated individuals divided by the total population. Rather, it represents the number of individuals confined to prison facilities per 100,000 people within the broader population. This measurement standardizes the comparison of incarceration levels across different populations, accounting for variations in population size. For instance, a prison rate of 500 per 100,000 signifies that 500 individuals out of every 100,000 in the general population are incarcerated, providing a standardized metric for evaluating imprisonment prevalence across diverse demographic groups and geographic regions.

Table 1: prison rate per 1000000 in 20 countries in 2023

country	prison_rate_per100000
France	109
Iceland	36

4

Austria	98
United Kingdom: England & Wales	145
Norway	52
Italy	103
Canada	88
Croatia	106
Spain	113
Sweden	82
Germany	67
Finland	51
Netherlands	65
United States of America	531
Belgium	97
Egypt	116
Singapore	156
Japan	36
Denmark	69
Switzerland	73

2.4 Measurement

In Figure 1, data from the Bureau of Justice Statistics (BJS) provides comprehensive insights into the populations incarcerated in state and federal prisons, as well as local jails, across the United States. Through meticulous data collection and analysis methods, including surveys, administrative records, and inmate censuses, the BJS offers precise estimates of the total number of individuals held in correctional facilities.

In Figure 2, the measurement in question assesses the percentage of men who have experienced incarceration up to two specific points in time: 1979 for individuals born between 1945 and 1949, and 2009 for those born between 1975 and 1979. This measurement considers race and educational attainment as variables and distinguishes between three groups: all men, men without college education, and men with less than twelve years of completed schooling.

For Figure 3, The World Prison Population List(Institute for Crime & Justice Policy Research (2023)) is compiled from a variety of sources. In almost all cases the original source is the national prison administration of the country concerned, or else the Ministry responsible for the prison administration. It's crucial to clarify that the "prison rate" isn't simply the quotient of incarcerated individuals divided by the total population. Rather, it represents the number of individuals confined to prison facilities per 100,000 people within the broader population.

For Figures Figure 4 and Figure 5, the original data is sourced from two prison questionnaires. For instance, the sample for the 2004 survey was drawn from two distinct documents. The

primary archive comprises a list of 1,549 state prisons from the June 30, 2000, BJS 2000 Census of State and Federal Correctional Facilities. Meanwhile, the secondary archive includes 36 prisons operational between June 30, 2000, and April 1, 2003. The sampling design necessitated a stratified two-stage selection process. Initially, 14 male and 7 female facilities were identified based on the gender ratio within prisons. Subsequently, the remaining facilities were divided into 16 levels according to geographic region and the male and female population within each prison. The weighting procedure involved assigning each inmate a base weight and three adjustment factors to derive the final weight for the survey. Data collection was conducted through face-to-face interviews with prisoners utilizing computer-assisted personal interviewing techniques.

The original study involved the utilization of a complex dataset derived from questionnaire surveys. The author meticulously filtered and cleaned this dataset, followed by the calculation of weights (albeit without detailed explanation). These weights were instrumental in determining the participation rates of incarcerated individuals in various programs, including drug rehabilitation, education, job training, and work assignments.

To measure the cumulative COVID-19 case rates among those in prison and the general population, by state, from March 2020 to January 2021, for Figure 6, follow these steps:

1. **Define the Population:** The populations of interest are individuals incarcerated in prisons and the general population of each state in the United States.

2. **Gather Data:** Obtain data on the total number of confirmed COVID-19 cases among individuals incarcerated in prisons and the general population of each state. This data can be sourced from state health departments, corrections departments, or other reliable sources tracking COVID-19 statistics.

3. **Determine the Time Period:** Specify the time frame for which you want to calculate the cumulative case rates, starting from March 2020 (when the pandemic was declared) and ending in January 2021.

4. **Calculate the Cumulative Case Rates:** For each state:

   - For incarcerated individuals: Divide the total number of confirmed COVID-19 cases among those in prison by the total incarcerated population in prisons for that state. Multiply the result by 100,000 to express the rate per 100,000 incarcerated individuals.
   - For the general population: Divide the total number of confirmed COVID-19 cases in the general population by the total population of the state. Multiply the result by 100,000 to express the rate per 100,000 people in the general population.

Subsequent chapters (Section 4.4) will delve into comprehensive discussions regarding biases and potential errors inherent in the measurement process.

3 Result

3.1 Over trend

Mass incarceration, as outlined by Garland (2001), refers to the historical phenomenon characterized by exceptionally high rates of imprisonment, particularly affecting marginalized populations. It signifies the confinement of vast numbers of individuals within prisons, coupled with the enduring legal and financial barriers they encounter upon reintegration into society, as described by Michelle S. Phelps and Pager (2016).

According to Figure 1, from 1925 to 1972, the incarceration rate in the United States exhibited a period of relative stability, punctuated by minor fluctuations. However, since the 1970s, the number of inmates in the U.S. has surged dramatically, increasing by over sixfold, as noted by Manza and Uggen (2004). Following its peak in 2007, incarceration rates have seen a slight decline over the past decade. However, they remain approximately five times higher than the average rate observed throughout the 20th century.

This underscores the continued importance of mass incarceration as a pressing issue in the United States. It highlights the need for further research to fully examine its effects on various aspects including health, property ownership, and personal growth. Furthermore, understanding its socioeconomic impact and exploring effective rehabilitation and reintegration strategies are important steps to address this multifaceted problem and build a more just and equitable society.
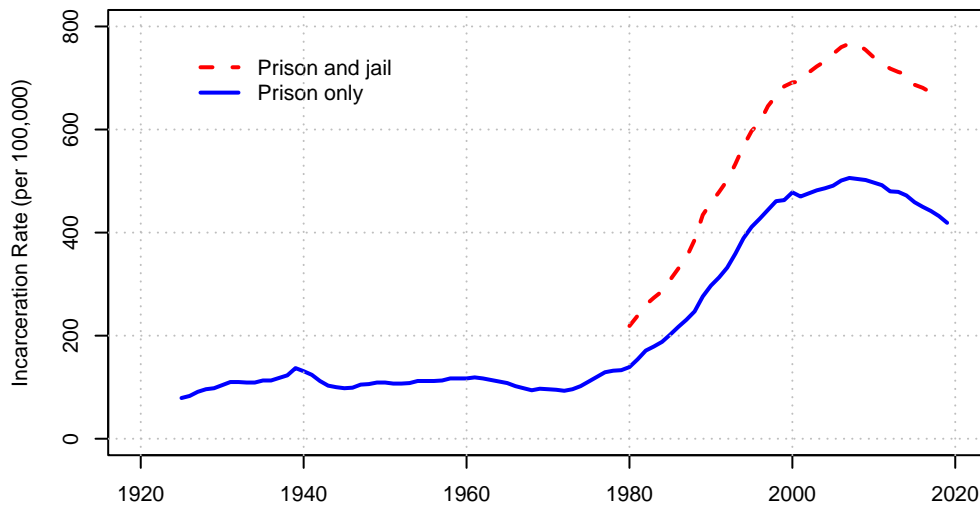

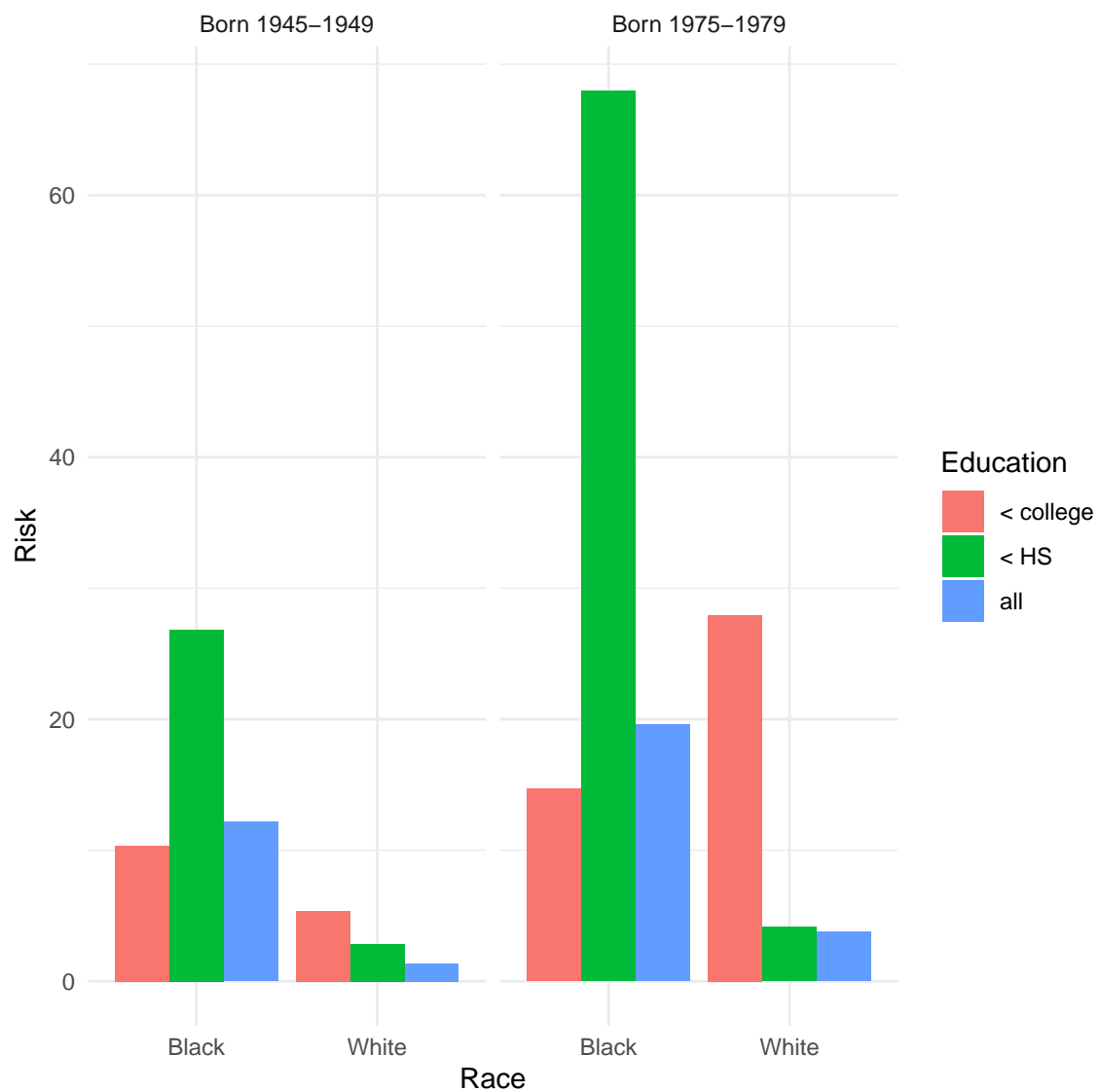Figure 1: US Incarceration, 1925-2018

Figure 2: Men's cumulative imprisonment risk, by cohort

3.2 Exploring Racial Disparities in Incarceration Trends

Despite extensive discussions surrounding the surge in the U.S. prison population over the last twenty-five years (Pettit and Western (2004)), scant attention has been paid to the evolution of incarceration inequality. Our study delves into sentencing disparities by analyzing the likelihood of incarceration among blacks and whites across varying educational attainment levels. The data(Figure 2) reveals stark contrasts: irrespective of educational achievement, black individuals face significantly higher incarceration rates compared to their white counterparts, particularly among those with less than twelve years of schooling.

3.3 Global Perspectives on Mass Incarceration

In addition to examining the trajectory of incarceration rates within the United States over time, it is equally imperative to conduct horizontal comparisons by scrutinizing incarceration rates across different countries. Such comparisons enable us to discern whether mass incarceration is a global phenomenon or if it manifests as a more acute issue within the United States.

Data regarding prison population rates per 100,000 of the national population is accessible through the online public data platform World Prison Brief. This resource provides updated country information on a monthly basis, drawing primarily from governmental or other authoritative sources, thereby ensuring the data's timeliness and reliability.

Upon acquiring the most recent data, we encountered complexity in processing the information for over 200 countries. Consequently, we streamlined our analysis by selecting a subset of 20 representative countries. Subsequently, we utilized this refined dataset to generate informative charts and visualizations (Figure 3).

In addition to the United States, which serves as the primary focus of our research, the selected subset of 19 countries encompasses a diverse range of geographical locations across all seven continents. These countries represent various levels of development, including developed nations, developing regions, and areas classified as less economically developed. Moreover, the chosen countries vary in terms of land area, with some comparable in size to the United States, such as Canada and, to a lesser extent, Iceland. This diverse selection ensures a comprehensive analysis that accounts for a wide spectrum of geographic, developmental, and size-related factors.

It can be readily inferred from graphical representations and pertinent research that the United States holds the title of the world's foremost incarcerator, detaining a higher percentage of its population than any other nation.

It is noteworthy that the incarceration rates (per 100,000) observed in the other 19 countries typically hover around 100. In stark contrast, the United States exhibits an incarceration

rate exceeding four times this average. This significant disparity underscores the exceptional nature of the U.S. incarceration system compared to its international counterparts.
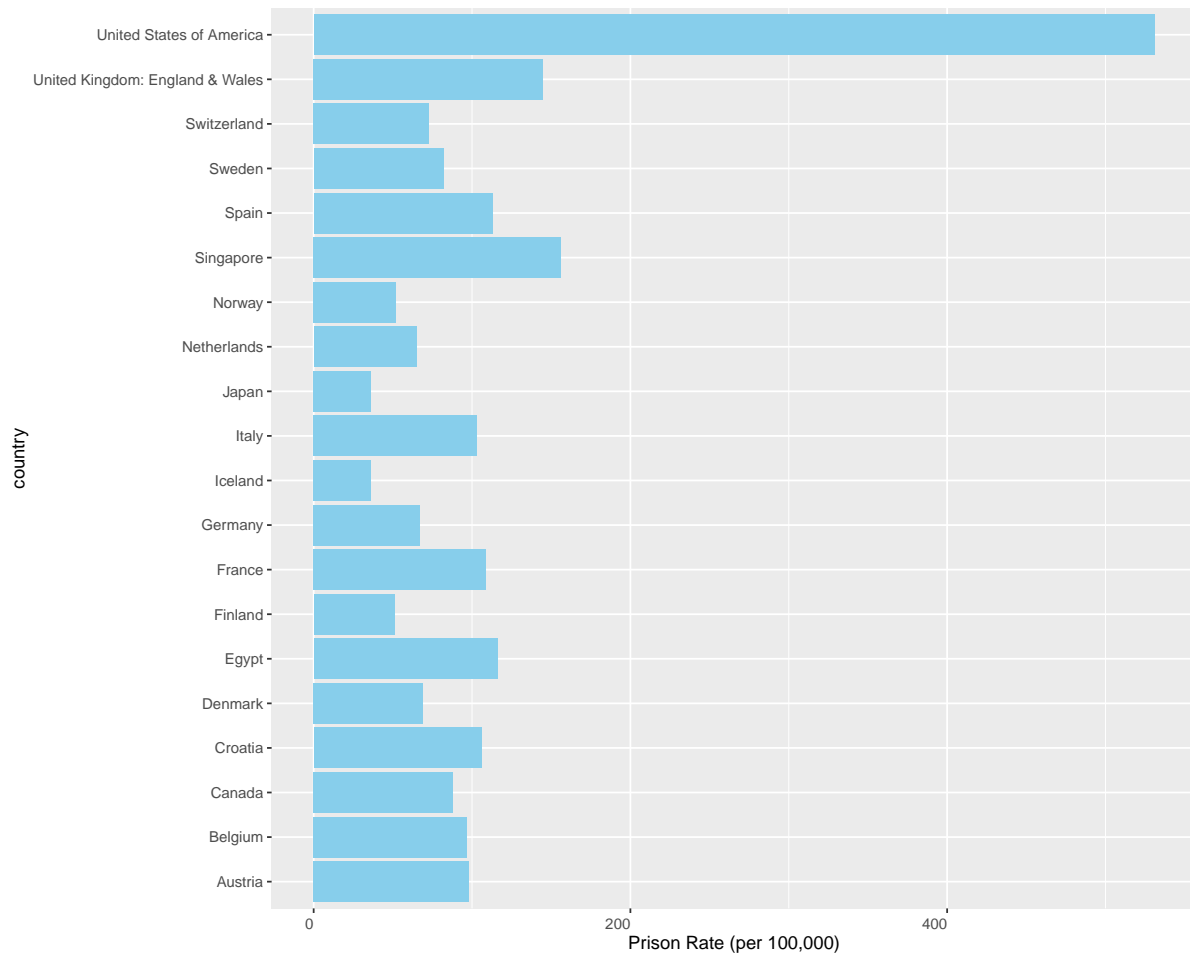

Figure 3: Prison Population Rate by Country in 2023

4 Discussion

4.1 What is done in this paper

Through rigorous data collection, cleaning, and analysis procedures, we meticulously obtained vital incarceration rate data spanning from 1925 to 2018 for the United States. Additionally, we meticulously compiled statistics on Men's cumulative imprisonment risk, organized by cohort, and meticulously gathered data on the incarceration rates of 20 countries worldwide, including the United States, up to 2023.

Delving into the phenomenon of mass incarceration, we meticulously examined its historical underpinnings, contemporary trajectories, and global ramifications. Our analysis underscores the staggering surge in the U.S. prison population since the 1970s, notwithstanding recent marginal declines, underscoring the persistent urgency in addressing the pervasive social issue of mass incarceration. Moreover, our study illuminates pronounced racial disparities in incarceration rates, particularly shedding light on the disproportionate impact on individuals from the Black community with limited educational opportunities.

Furthermore, we provide a comprehensive exploration of global perspectives on mass incarceration, revealing the United States as the foremost incarcerator globally compared to other nations. Subsequently, we delve into the critical implications of mass incarceration, particularly examining its profound effects on American society. This includes an in-depth examination of the United States' rehabilitation policies for incarcerated individuals, alongside an analysis of the prevalence of COVID-19 infections in American prisons during the epidemic. Additionally, we scrutinize the impact of relevant policies on the personnel involved in the prison system, offering valuable insights into the broader societal repercussions of mass incarceration.

4.2 rehabilitating

Rehabilitation refers to a series of interventions aimed at enhancing functioning and diminishing disability in individuals with health conditions, taking into account their interactions with the environment.Academics studying mass incarceration identify the 1970s as a critical juncture in U.S. penal history, characterized by a transition towards stricter punitive measures and a widespread belief that traditional rehabilitation methods were ineffective(Michelle S. Phelps (2011)).

The initial segment investigates prisoner engagement in rehabilitation initiatives across the United States. Figure 4 delineates four program categories (drug rehabilitation, education, job training, employment) and four regional divisions (Northeast, Midwest, South, West). Preliminary findings indicate that participation rates in the Northeast region tend to surpass those in the other three regions overall, whereas participation in the West region appears consistently lower across all four projects. Participation levels in the Southern region exhibit significant year-to-year fluctuations.

The processed data only provides a rough division of the United States into four major regions based on geographical location, limiting the possibility of conducting more detailed data analysis. Unfortunately, the original author only briefly mentioned the data source without elaborating on the data processing methods. Moreover, due to the large size of the original dataset, extracting more detailed variable classification data proved to be challenging.

The original data table exclusively focused on a subset of admitted individuals for the analysis of the American Prison Rehabilitation Program. Consequently, we opted to select the not admitted portion of the dataset to create similar charts for comparative analysis. Figure 5 illustrates that there is minimal disparity between the two groups regarding participation in

Figure 4: Enrollment in Drug, Education, Job Training Programs, and Work Assignment, State Prisoners, by Region_admit
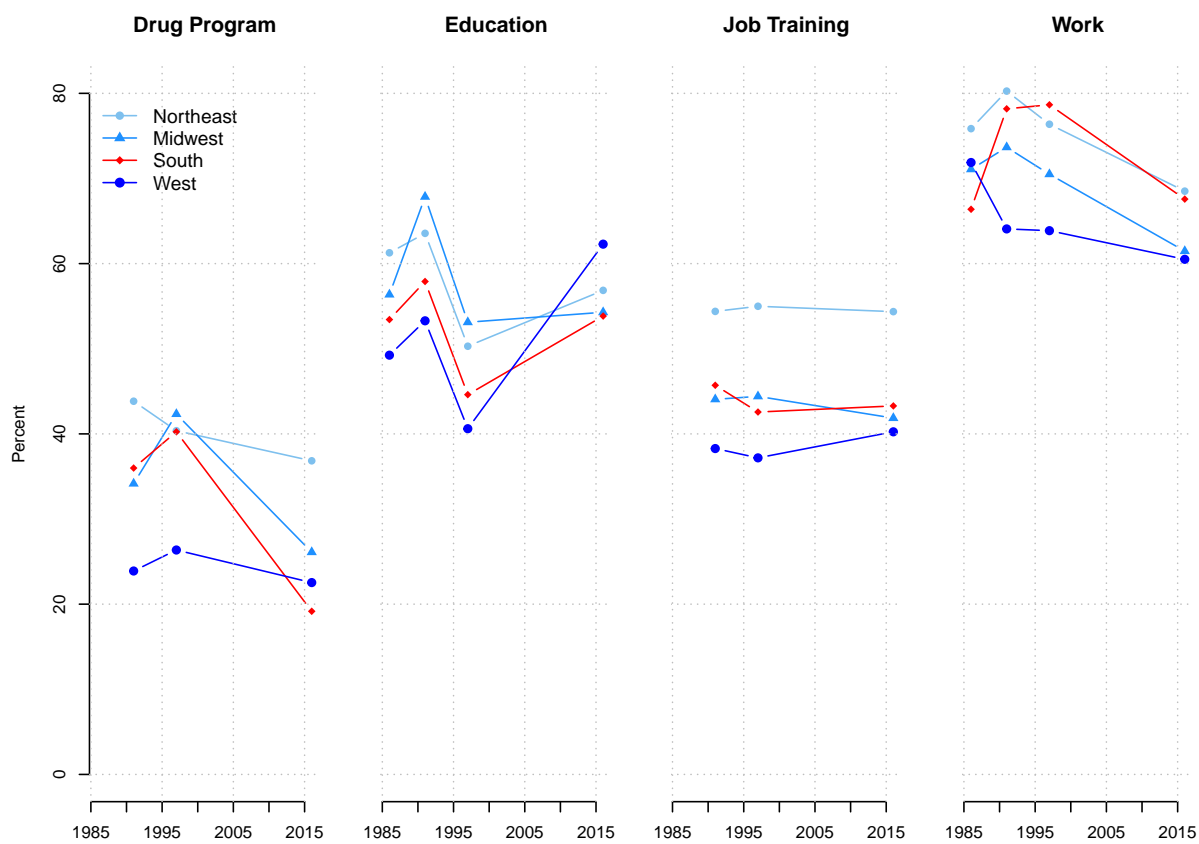
Figure 5: Enrollment in Drug, Education, Job Training Programs, and Work Assignment, State Prisoners, by Region_not_admit

drug rehabilitation and employment programs. However, the non-admitted group exhibits higher participation rates in education and vocational training initiatives.

There is increasing evidence suggesting that in certain instances, incarceration can facilitate prisoners' reintegration into society (Arbour, Lacroix, and Marchand (2021)). Therefore, it may be beneficial for the U.S. government to implement additional programs aimed at assisting prisoners in readjusting to society. This approach not only reflects a commitment to humanistic values but also serves to bolster social security and foster broader societal development.

4.3 Cumulative COVID-19 Case Rates among Those in Prison and General Population

The closed and densely populated environment within prisons creates ideal conditions for the proliferation of large infectious diseases. The data stemming from the recent COVID-19 pandemic serves as a poignant illustration of this perspective, offering detailed insights into the heightened vulnerability of incarcerated populations to the rapid transmission and severe impact of contagious illnesses.

The prison population stands out as a high-risk demographic group during the coronavirus disease 2019 (COVID-19) pandemic. In addition to residing in environments that are inherently challenging for practicing "social distancing," individuals within prisons often exhibit advanced age and possess multiple comorbidities. These characteristics are reflective of punitive policies that are discriminatory in nature and implemented worldwide (Elbek (2020)).

When comparing the overall new coronavirus infection rate among the American population with the new coronavirus infection rate among prison inmates, a clear trend emerges according to the chart (Figure 6). In the majority of states in the United States, the data pertaining to infection rates among prison inmates surpasses that of the general population by a significant margin.

The significant number of individuals held in incarceration across the United States, combined with prevalent environmental conditions within correctional facilities—such as overcrowding, limited sanitation, inadequate healthcare access, subpar ventilation, and challenges in maintaining social distancing—have presented distinct and substantial challenges and risks for both incarcerated individuals and staff members throughout the pandemic (Nowotny et al. (2020)).

Novisky, Narvey, and Semenza (2020) indicates that the implementation of varied epidemic prevention policies across different states in the United States, alongside differences in the infrastructure of state prisons, has resulted in significant disparities in prisoner infection rates.

In addition to replicating the original data, we have incorporated a comparison of the COVID-19 infection rate among prison staff with the overall U.S. COVID-19 infection rate. According to the figure(Figure 7), the infection rate among prison staff surpasses the overall infection

rate but remains lower than the new coronavirus infection rate among incarcerated individuals, positioning it roughly in the middle between the two. This observation underscores the vulnerable position of prisoners within correctional facilities during the pandemic.

4.4 Weaknesses

4.4.1 Bias in Data Analysis

On one hand, it's noteworthy that a considerable portion of data regarding U.S. prisons exclusively pertains to men, leading to the phenomenon referred to as "big dick data." This term underscores the prevalence of male-dominated datasets, which not only underscores systemic bias and marginalization, particularly towards women but also sheds light on existing power dynamics. The absence or marginalization of women in these datasets not only mirrors prevailing power structures but also perpetuates gender-based biases and stereotypes. Such gender disparity distorts our comprehension of reality, reinforces harmful stereotypes and inequalities, and presents substantial hurdles to data-driven decision-making (D'Ignazio and Klein (2020)).

On the other hand, when examining racial data, it tends to be categorized broadly into whites and blacks. This practice not only reinforces the binary opposition between these two racial groups in the United States but also overlooks the experiences of other ethnic minorities.

4.4.2 Measurement error

Utilizing data from various origins, a practice known as data fusion or integration, introduces complexities and hurdles that can result in measurement inaccuracies. Each dataset carries its unique biases, constraints, and inaccuracies stemming from variations in data collection methods, sampling approaches, measurement tools, and processing methodologies.

The amalgamation of data from disparate sources often introduces disparities in quality, consistency, and reliability, leading to inconsistencies or inaccuracies in the merged datasets. Moreover, issues like incomplete data, absent values, and misclassification errors can compound measurement inaccuracies.

4.5 future

On the one hand, similar data collection, statistical analysis, and comparative studies of Canadian prisons provide an attractive avenue for gaining insights due to Canada's geographic proximity to the United States and some shared cultural and legal frameworks. This similarity in land area and certain social aspects may allow for more meaningful comparisons and broader conclusions.
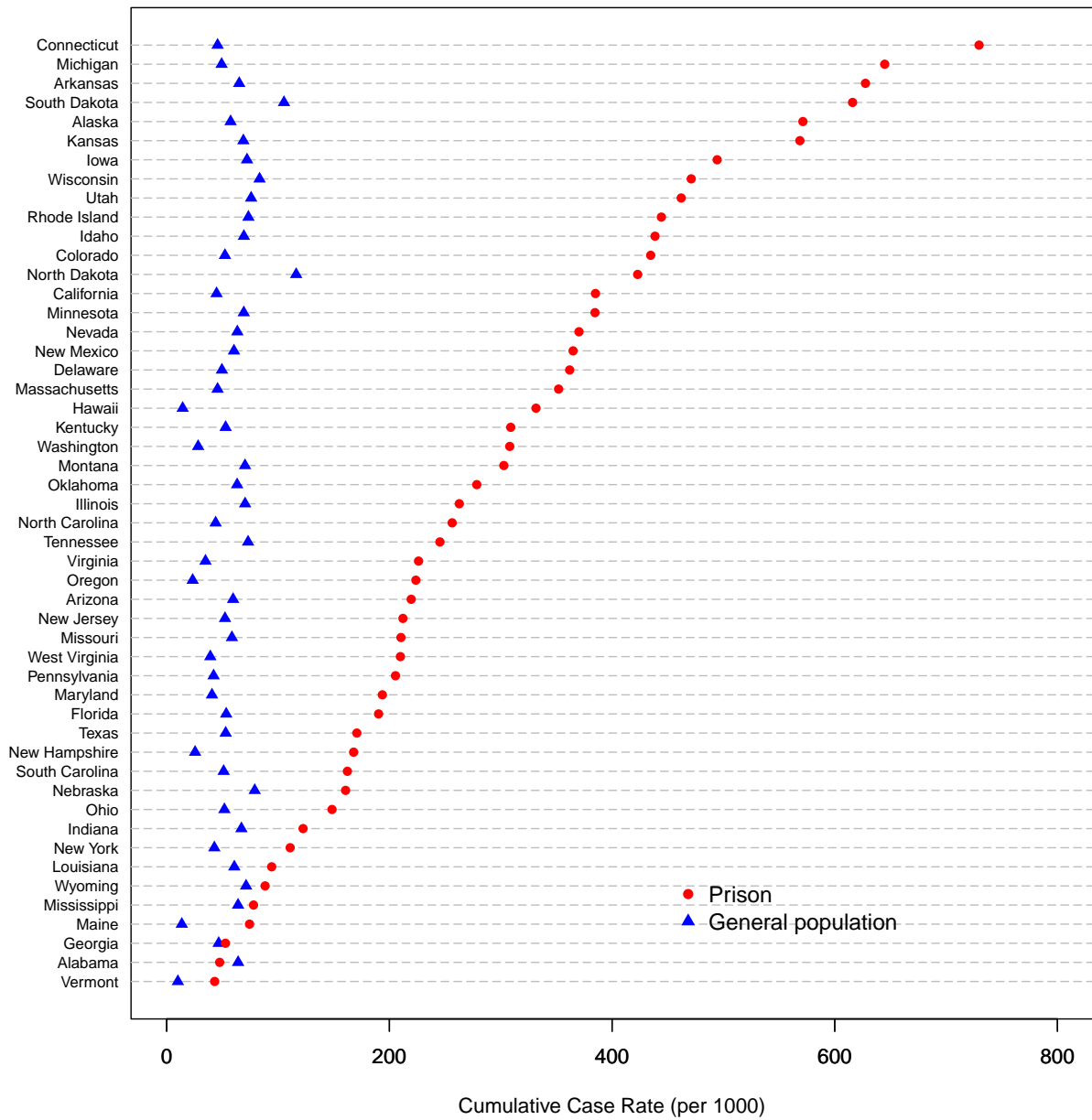
Figure 6: Cumulative COVID-19 Case Rates among Those in Imprisoned persons and General Population, by State
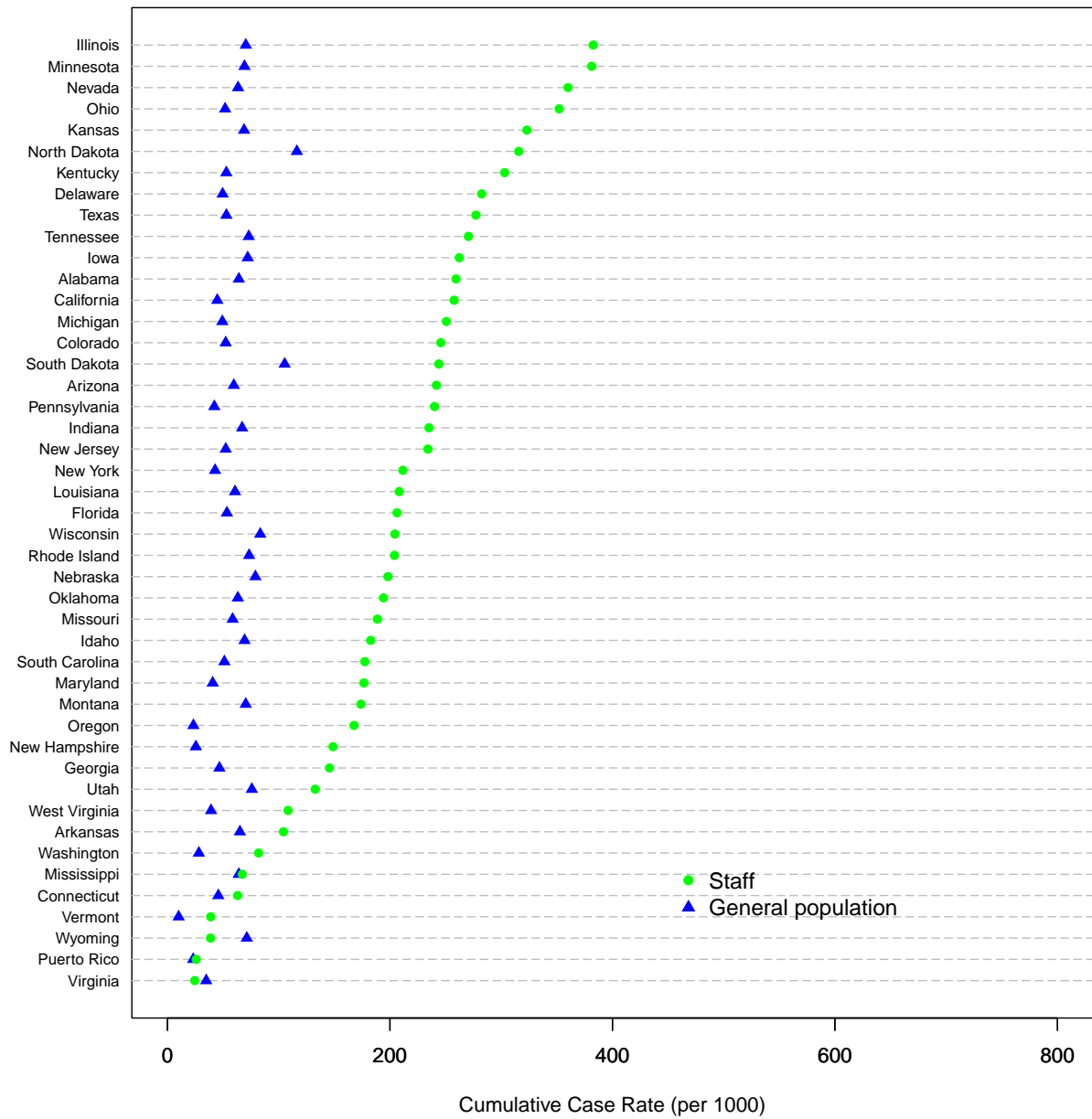
Figure 7: Cumulative COVID-19 Case Rates among Those in Prison Staff and General Population

On the other hand, a comparison of prison data from smaller Nordic countries, represented by Iceland, gives a markedly different context. These countries tend to have very different social norms, legal frameworks, and approaches to criminal justice than North American countries. Factors such as smaller population sizes, different cultural attitudes toward crime and punishment, and alternative approaches to rehabilitation may contribute to contrasting prison data.

Apart from large-scale studies, conducting small controlled experiments could offer valuable insights into the influence of different prison environments on the physical and mental well-being of inmates.

Studying the experiences of prison staff can provide insight into challenges within correctional facilities and facilitate the development of effective policies. Likewise, exploring the impact of incarceration on families can provide greater insight into broader social impacts, including emotional distress and financial stress. Including their voices in research and policy discussions is critical to addressing the complex issues surrounding incarceration and reentry.

References

Arbour, William, Guy Lacroix, and Steeve Marchand. 2021. "Prison Rehabilitation Programs: Efficiency and Targeting."

Bureau of Justice Statistics. 1994. "Survey of Inmates of State Correctional Facilities, 1986." Ann Arbor, MI: Inter-University Consortium for Political; Social Research. https://doi.org/10.3886/ICPSR08711.v2.

———. 2004a. "Survey of Inmates of State and Federal Correctional Facilities, 1997," no. ICPSR2598. https://doi.org/10.3886/ICPSR02598.v1.

———. 2004b. "Survey of Inmates of State Correctional Facilities, 1991," no. ICPSR6068. https://doi.org/10.3886/ICPSR06068.v1.

———. 2006. "Survey of Inmates of State and Federal Correctional Facilities, 1997," no. ICPSR2598. https://doi.org/10.3886/ICPSR02598.v1.

———. 2019. "Survey of Inmates of State and Federal Correctional Facilities, 2004," no. ICPSR4572. https://doi.org/10.3886/ICPSR04572.v6.

———. 2020. "National Crime Victimization Survey, 2016," no. ICPSR37296. https://doi.org/10.3886/ICPSR37296.v2.

———. 2021. "Survey of Prison Inmates, United States, 2016," no. ICPSR37692. https://doi.org/10.3886/ICPSR37692.v4.

Carson, E. Ann. 2020. "Prisoners in 2019." Bureau of Justice Statistics; https://bjs.ojp.gov/content/pub/pdf/p19.pdf.

Carson, E. Ann, and Mary P. Cowhig. 2020. *Mortality in State and Federal Prisons, 2001–2016 – Statistical Tables*. Washington, DC: US Department of Justice.

COVID Prison Project. 2020. "COVID-19 in Correctional Facilities." Washington, DC: Committee on Best Practices for Implementing Decarceration as a Strategy for Mitigating the Spread of COVID-19 in Correctional Facilities, The National Academies of Sciences, Engineering,; Medicine. 2020. %3Chttps://www.nap.edu/catalog/25962/covid-19-in-correctional-facilities%3E.

COVID Tracking Project. 2021. "The COVID Tracking Project: All States." 2021. %3Chttps://covidtracking.com%3E.

D'Ignazio, Catherine, and Lauren F. Klein. 2020. *Data Feminism*. The MIT Press.

Elbek, O. 2020. "COVID-19 Pandemic Threatening Prison Population." *Turk Thorac J* 21 (6): 433–37. https://doi.org/10.5152/TurkThoracJ.2020.20114.

Firke, Sam. 2023. *Janitor: Simple Tools for Examining and Cleaning Dirty Data*. https://CRAN.R-project.org/package=janitor.

Garland, David. 2001. "Introduction: The Meaning of Mass Imprisonment." *Punishment & Society* 3 (1): 5–7. https://doi.org/10.1177/14624740122228203.

Institute for Crime & Justice Policy Research. 2023. "World Prison Brief, World Prison Population List." 2023. %3Chttps://www.prisonstudies.org/world-prison-brief-data%3E.

Manza, Jeff, and Christopher Uggen. 2004. "Punishment and Democracy: Disenfranchisement of Nonincarcerated Felons in the United States." *Perspectives on Politics* 2 (3): 491–505. https://doi.org/10.1017/S1537592704040290.

Müller, Kirill, and Hadley Wickham. 2023. *Tibble: Simple Data Frames.* https://github.com/tidyverse/tibble.

National Center for Health Statistics. 2021. "Underlying Cause of Death." 2021. %3Chttps://www.cdc.gov/nchs/fastats/homicide.htm%3E.

Novisky, Meghan A., Chelsey S. Narvey, and Daniel C. Semenza. 2020. "Institutional Responses to the COVID-19 Pandemic in American Prisons." *Victims & Offenders* 15 (7-8): 1244–61. https://doi.org/10.1080/15564886.2020.1825582.

Nowotny, Kathryn, Zinzi Bailey, Maayan Omori, and Lauren Brinkley-Rubenstein. 2020. "COVID-19 Exposes Need for Progressive Criminal Justice Reform." *American Journal of Public Health* 110 (7): e1–2. https://doi.org/10.2105/AJPH.2020.305707.

Pennsylvania Department of Corrections. 2018. "Inmate Data 2007-2016." [confidential datafile].

Pettit, Becky, and Bruce Western. 2004. "Mass Imprisonment and the Life Course: Race and Class Inequality in u.s. Incarceration." *American Sociological Review* 69 (2): 151–69. https://doi.org/10.1177/000312240406900201.

Phelps, Michelle S. 2011. "Rehabilitation in the Punitive Era: The Gap Between Rhetoric and Reality in u.s. Prison Programs." *Law & Society Review* 45 (1): 33–68. https://doi.org/https://doi.org/10.1111/j.1540-5893.2011.00427.x.

Phelps, Michelle S, and Devah Pager. 2016. "Inequality and Punishment: A Turning Point for Mass Incarceration?" *The ANNALS of the American Academy of Political and Social Science* 663 (1): 185–203. https://doi.org/10.1177/0002716215596972.

R Core Team. 2022. *R: A Language and Environment for Statistical Computing.* Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

University at Albany, Hindelang Criminal Justice Research Center. 2011. "Sourcebook of Criminal Justice Statistics." Table 6.1. %3Chttps://www.albany.edu/sourcebook/pdf/t612011.pdf%3E.

———. 2012. "Sourcebook of Criminal Justice Statistics." Table 6.28. %3Chttps://www.albany.edu/sourcebook/pdf/t6282012.pdf%3E.

U.S. Bureau of Economic Analysis. Year. "Population [B230RC0A052NBEA]." Year. %3Chttps://fred.stlouisfed.org/series/B230RC0A052NBEA%3E.

U.S. Census Bureau. Year. "Annual Estimates of the Resident Population for the United States, Regions, States, the District of Columbia, and Puerto Rico." Year. %3Chttps://www.census.gov/programssurveys/popest/technical-documentation/research/evaluation-estimates/2020evaluation-estimates/2010s-state-total.html%3E.

Wakefield, Sara, and Christopher Uggen. 2010. "Incarceration and Stratification." *Annual Review of Sociology* 36 (1): 387–406. https://doi.org/10.1146/annurev.soc.012809.102551.

Walker, Alexander. 2022. "Openxlsx: Read, Write and Edit XLSX Files." https://CRAN.R-project.org/package=openxlsx.

Western, Bruce. 2021. "Inside the Box: Safety, Health, and Isolation in Prison." *Journal of Economic Perspectives* 35 (4): 97–122. https://doi.org/10.1257/jep.35.4.97.

Western, Bruce, and Becky Pettit. 2010. "Incarceration & Social Inequality." *Daedalus* 139 (3): 8–19.

Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis.* Springer-Verlag New York. https://ggplot2.tidyverse.org.

———. 2023. *Stringr: Simple, Consistent Wrappers for Common String Operations.* https://stringr.tidyverse.org.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.

Wickham, Hadley, Romain François, Lionel Henry, Kirill Müller, and Davis Vaughan. 2023. *Dplyr: A Grammar of Data Manipulation.* https://dplyr.tidyverse.org.

Wickham, Hadley, Jim Hester, and Jennifer Bryan. 2024. *Readr: Read Rectangular Text Data.* https://readr.tidyverse.org.

Wickham, Hadley, Evan Miller, and Danny Smith. 2023. *Haven: Import and Export 'SPSS', 'Stata' and 'SAS' Files.* https://haven.tidyverse.org.

Xie, Yihui. 2023. *Knitr: A General-Purpose Package for Dynamic Report Generation in r.* https://yihui.org/knitr/.

Zeng, Zhen. 2020. "Jail Inmates in 2018." Bureau of Justice Statistics. %3Chttps://bjs.ojp.gov/content/pub/pdf/ji18.pdf%3E.